Space Weather Forecast

Issued on Thursday, 15 February 2024 at 00:36 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight Chance G1 Minor Geomagnetic Storms Day 1 (15 Feb) due to possible coronal mass ejection arrival. Isolated Moderate flares likely, and slight chance Strong flares.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Moderate activity in the last 24 hours with two low level Moderate-class flares recorded. There are seven numbered and one un-numbered sunspot regions on the visible disc, with the active region in the southwest persisting as the largest and most complex region, having seen some growth of positive spots around the main leader, and maintaining a complex magnetic configuration. In the northwest quadrant there are also two moderately sized bi-polar regions, however these have a simpler magnetic configuration, giving a lower potential for notable flares. Both these regions remain relatively stable with some slight decay now evident. A recently numbered spot group continues to rotate around the northeast limb, with a single moderate sized spot visible at present. Remaining spot region are small and magnetically simple.

No Earth-directed coronal mass ejections (CMEs) were observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds were between background to slight-elevated levels, 350-500km/s, but generally near 450 km/s. Interplanetary magnetic field (IMF) Bt, was at weak levels, but increased to moderate from around 14/2218 UT. The north-south directed field, Bz, varied weakly. Geomagnetic activity was mostly Quiet (Kp 0 to 1), but was Unsettled (Kp 3) 14/0000-0600 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was above the Minor Radiation Storm level through much of the period, peaking at 14/1030 UTC, then slowly declining. Levels fell consistently below the S1 threshold after 14/2000 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with the likelihood of further isolated Moderate flares, and a slight chance of Strong flares. These most likely from the large region in the southwest.

Solar Wind / Geomagnetic Activity: There is one CME still thought to have the potential to influence the near Earth environment, this associated with the M9 flare on 10 Feb. This was originally expected on 13 Feb, but its delayed arrival may be being observed as a weak enhancement in solar wind parameters at 14/2218 UTC.

Solar winds are currently slightly elevated with any further weak CME influence not anticipated to significantly increase winds during day 1 (15 Feb). There are also no significant coronal hole enhancements expected, with coronal hole 97 likely too far south, and small coronal hole 99

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likely too far north to influence solar winds at Earth.

A slight chance of Active to G1 Minor Storms is maintained for day 1 (15 Feb) given some likely weak CME influence at first. Otherwise, mainly Quiet activity is expected, with a chance of isolated Unsettled intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is now just below the S1 Minor Radiation Storm, and on a slowly declining trend. Proton flux is expected to continue slowly declining through the period in the absence of further significant flare activity. However, there does remain an ongoing chance of further enhancements, most likely from the large sunspot region in the southwest, given any significant flares,

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	60	50
Very Active	R3 to R5 X	No	15	15	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	40	30	20	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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